

REMARKS

In the June 26, 2009 Office Action, all of the claims stand rejected in view of prior art. No other objections or rejections were made in the Office Action.

Status of Claims and Amendments

In response to the June 26, 2009 Office Action, Applicant has amended claim 1 as indicated above. Also, Applicant has cancelled claims 2 and 4. Thus, claims 1 and 3 are pending, with claim 1 being the only independent claim. Reexamination and reconsideration of the pending claims are respectfully requested in view of above amendments and the following comments.

Rejections - 35 U.S.C. § 103

In paragraphs 2-5 of the Office Action, claims 1-4 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,592,346 (Bushnell) in view of U.S. Patent No. 4,172,465 (Dashner). In response, Applicant has amended independent claim 1 to more clearly define the present invention over the prior art of record.

In particular, independent claim 1 now requires, *inter alia*, a reed valve coupled to the compressor mechanism to open and close the discharge port of the compressor mechanism, the reed valve including a flat part and a protruding part formed at a distal end of the flat part to come in and out of the discharge port,

the shape of the discharge port and the shape of the reed valve being dimensioned to satisfy

$S_2 \geq S_1 \geq S_0$, where

S_0 is an opening area of an inlet of the discharge port,

S_1 is a smallest cross sectional area of a flow passage formed between the protruding part and the discharge port when the reed valve is lifted to a maximum level,

S2 is a smallest cross sectional area of a flow passage formed between the flat part and an outer periphery of an outlet of the discharge port when the reed valve is lifted to the maximum level, with

the discharge port being tapered from the outlet to the inlet, and the protruding part being tapered toward a distal end thereof substantially in a same manner as the discharge port. This amendment is supported by, for example, paragraph [0032] of the specification and FIG. 3 of the instant application. Clearly this arrangement is *not* disclosed or suggested by the Bushnell patent and/or the Dashner patent, singularly or in combination.

The present invention aims to reduce the dead volume of the discharge port, and to avoid reduction in sectional area of a flow passage in the discharge port when the valve is fully opened by providing a reed valve having a protruding part tapered toward the distal end thereof substantially in the same manner as the discharge port, as now set forth in independent claim 1.

Bushnell (U.S. Patent No. 6,592,346) discloses a reed valve consisting of a poppet valve having a protruding part similar to that of the present application. In Bushnell, however, the discharge port is cylindrical, while the protruding part is hemispherical. Thus, Bushnell lacks the discharge port being tapered from the outlet to the inlet, and the protruding part being tapered toward a distal end thereof substantially in a same manner as the discharge port, as now required by independent claim 1. In fact, the shapes of the discharge port and the protruding part of Bushnell are completely different, and the protruding part is considerably small relative to the discharge port. Incidentally, with this structure of Bushnell, it is almost impossible to reduce the dead volume of the discharge port. Further, the reduction in sectional area of the flow passage in the discharge port particularly when the valve is fully opened is less likely to occur. Therefore, Bushnell has no intention of reducing the dead volume, and avoiding the reduction in sectional area of the flow passage when the valve is fully opened.

Dashner (U.S. Patent No. 4,172,465) discloses a check valve consisting of a ball valve. The check valve includes a semi-spherical valve member, and a discharge port tapered from the outlet to the inlet. Thus, Dashner also lacks the discharge port being tapered from the outlet to the inlet, and the protruding part being tapered toward a distal end thereof substantially in a same manner as the discharge port, as now required by independent claim 1.

In fact, the discharge port and valve member of Dashner have completely different shapes. Moreover, the valve member of Dashner is movable in the axial direction of the discharge port. With this check valve, particularly when the valve is fully opened, the flow passage area from the inlet to the outlet of the discharge port gradually increases. That is, the flow passage area will not be reduced. Further, unlike the discharge valve in a compressor, there is no need of reducing the dead volume, since this valve of Dashner is not used in a compressor. Therefore Dashner cannot provide any reason to modify the shape(s) of the valve member and/or discharge port to result in the unique arrangement of independent claim 1, as now amended.

For the reasons above, even if the two cited references are combined, such combined teachings merely modify the discharge port of the reed valve of Bushnell to be tapered. Thus, the combined teachings of these references do not disclose suggest determining the shapes of the discharge port and the valve in connection with the sectional area of the flow passage in the discharge port particularly when the valve is fully opened, i.e., the two cited references do not provide any suggestion of (reason to) avoiding the reduction in sectional area of the flow passage that is easily caused by tapering the protruding part according to the shape of the discharge port, as now clearly required by independent claim 1. Accordingly, withdrawal of this rejection of independent claim 1 is respectfully requested.

Under U.S. patent law, the mere fact that the prior art can be modified does *not* make the modification obvious, unless an *apparent reason* exists based on evidence in the record or scientific reasoning for one of ordinary skill in the art to make the modification. See, KSR Int'l Co. v. Teleflex Inc., 127 S.Ct. 1727, 1741 (2007). The KSR Court noted that obviousness cannot be proven merely by showing that the elements of a claimed device were known in the prior art; it must be shown that those of ordinary skill in the art would have had some “apparent reason to combine the known elements in the fashion claimed.” Id. at 1741. In this case, the current record lacks any apparent reason, suggestion or expectation of success for combining the patents, and then further modifying the hypothetical device created by the hypothetical combination in order to create Applicants’ unique arrangement of independent claim 1. Accordingly, withdrawal of this rejection of independent claim 1 is respectfully requested.

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Amendment dated September 25, 2009
Reply to Office Action of June 26, 2009

Moreover, Applicant believes that dependent claim 3 is also allowable over the prior art of record in that it depends from independent claim 1, and therefore is allowable for the reasons stated above with respect to independent claim 1. Also, dependent claim 3 is further allowable because it includes additional limitations, which in combination with the limitations of independent claim 1, are not disclosed or suggested in the prior art of record. Accordingly, withdrawal of this rejection of dependent claim 3 is also respectfully requested.

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In view of the foregoing amendment and comments, Applicant respectfully asserts that claims 1 and 3 are now in condition for allowance. Reexamination and reconsideration of the pending claims are respectfully requested. If there are any questions regarding this Amendment, please feel free to contact the undersigned.

Respectfully submitted,

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